AMENDMENTS TO THE CLAIMS

1-41 (Withdrawn)

42. (Currently Amended) An impulse radio transmitter, comprising:

a precision timing generator to receive a periodic timing signal and an information signal and to produce ~~at least~~ one of a first signal and a second signal based on said information signal and said periodic timing signal;

a first pulser to receive said first signal and to produce, in response to said first signal, a first impulse radio signal consisting of a first type of impulse waveform;

a second pulser to receive said second signal and to produce, in response to said second signal, a second impulse radio signal consisting of a second type of impulse waveform, wherein said second type of impulse waveform is substantially an inverse of said first type of impulse waveform; and

a combiner to combine said first impulse radio signal and said second impulse radio signal and thereby produce a flip modulated impulse radio signal.

43. (previously presented) The impulse radio transmitter of claim 42, wherein said precision timing generator produces said first signal and said second signal based on at least said information signal and a code signal, and wherein said first signal comprises a first trigger signal and said second signal comprises a second trigger signal.

44. (previously presented) The impulse radio transmitter of claim 42, wherein said precision timing generator produces said first signal and said second signal based on at least said information signal and a code signal, and wherein said first signal comprises a first enable signal and said second signal comprises a second enable signal.

45. (previously presented) The impulse radio transmitter of claim 44, wherein said precision timing generator also produces a common trigger signal, and said first pulser and said second pulser are adapted to receive said common trigger signal.

46. (previously presented) The impulse radio transmitter of claim 45, wherein:

said first pulser produces said first impulse radio signal in response to receiving both said common trigger signal and said first enable signal, and

said second pulser produces said second impulse radio signal in response to receiving both said common trigger signal and said second enable signal.

47. (previously presented) The impulse radio transmitter of claim 42, wherein said first impulse waveform consists of a negative impulse and wherein said second impulse waveform consists of a positive impulse.

48. (previously presented) The impulse radio transmitter of claim 42, wherein said first impulse waveform corresponds to a first data state and said second impulse waveform corresponds to a second data state.

49. (previously presented) An impulse radio transmitter, comprising:

a precision timing generator to receive a periodic timing signal and an information signal and to produce, based on said information signal and said periodic signal, a first signal, a delayed first signal, a second signal, and a delayed second signal;

a first pulser to produce a first impulse radio signal, in response to said first signal, and a delayed first impulse radio signal, in response to said delayed first signal, wherein said first impulse radio signal and said delayed first impulse radio signal consist of a first type of impulse waveform;

a second pulser to produce a second impulse radio signal, in response to said second signal, and a delayed second impulse radio signal, in response to said delayed second signal,

wherein said second impulse radio signal and said delayed second impulse radio signal consist of a second type of impulse waveform, wherein said second type of impulse waveform is substantially an inverse of said first type of impulse waveform; and

a combiner to combine at least one of said first impulse radio signal and said delayed first impulse radio signal with at least one of said second impulse radio signal and said delayed second impulse radio signal, and thereby produce a flip modulated impulse radio signal.

50. (previously presented) The impulse radio transmitter of claim 49, wherein said precision timing generator produces said first signal, said delayed first signal, said second signal and said delayed second signal based on at least said information signal and a code signal, and wherein said first signal comprises a first trigger signal, said delayed first signal comprises a delayed first trigger signal, said second signal comprises a second trigger signal, and said delayed second signal comprises a delayed second trigger signal.

51. (previously presented) The impulse radio transmitter of claim 49, wherein said precision timing generator produces said first signal, said delayed first signal, said second signal and said delayed second signal based on at least said information signal and a code signal, and wherein said first signal comprises a first enable signal, said delayed first signal comprises a delayed first enable signal, said second signal comprises a second enable signal, and said delayed second signal comprises a delayed second enable signal.

52. (previously presented) The impulse radio transmitter of claim 51, wherein said precision timing generator also produces a common trigger signal, and said first pulser and said second pulser are adapted to receive said common trigger signal.

53. (previously presented) The impulse radio transmitter of claim 52, wherein:

said first pulser produces said first impulse radio signal in response to receiving both said common trigger signal and said first enable signal,

said first pulser produces said delayed first impulse radio signal in response to receiving both said common trigger signal and said delayed first enable signal,

said second pulser produces said second impulse radio signal in response to receiving both said common trigger signal and said second enable signal, and

said second pulser produces said delayed second impulse radio signal in response to receiving both said common trigger signal and said delayed second enable signal.

54. (previously presented) The impulse radio transmitter of claim 49, wherein said first impulse waveform consists of a negative impulse and wherein said second impulse waveform consists of a positive impulse.

55. (previously presented) The impulse radio transmitter of claim 49, wherein said first impulse waveform corresponds to a first data state and a second data state, and said second impulse waveform corresponds to a third data state and a forth data state.

56. (previously presented) A method for transmitting impulse radio signals, comprising the steps of:

a. producing a first signal and a second signal using a periodic timing signal and an information signal;

b. producing, in response to said first signal, a first impulse radio signal consisting of a first type of impulse waveform;

c. producing, in response to said second signal, a second impulse radio signal consisting of a second type of impulse waveform, wherein said second type of impulse waveform is substantially an inverse of said first type of impulse waveform; and

d. combining said first impulse radio signal and said second impulse radio signal to thereby produce a flip modulated impulse radio signal.

57. (previously presented) The method according to claim 56, wherein step a. comprises producing said first signal and said second signal using at least said periodic timing signal, said information signal and a code signal, and wherein said first signal comprises a first trigger signal and said second signal comprises a second trigger signal.

58. (previously presented) The method according to claim 57, wherein step a. comprises producing said first signal and said second signal using at least said periodic timing signal, said information signal and a code signal, and wherein said first signal comprises a first enable signal and said second signal comprises a second enable signal.

59. (previously presented) The method according to claim 58, further comprising the step of producing a common trigger signal using at least said periodic timing signal and said information signal, and

wherein step b. comprises producing said first impulse radio signal in response to said first enable signal and said common trigger signal, and wherein step c. comprises producing said second impulse radio signal in response to said second enable signal and said common trigger signal.

60. (previously presented) The method according to claim 59, wherein:

said first impulse radio signal is produced in response to reception of both said common trigger signal and said first enable signal, and

said second impulse radio signal is produced in response to reception of both said common trigger signal and said second enable signal.

61. (previously presented) The method according to claim 56, wherein said first type of waveform comprises a negative impulse and said second type of waveform comprises a positive impulse.

62. (previously presented) The method according to claim 56, wherein said first type of impulse waveform corresponds to a first data state and said second type of impulse waveform corresponds to a second data state.

63. (currently amended) A method of transmitting impulse radio signals, comprising the steps of:

a. producing a first signal, a delayed first signal, a second signal, and a delayed second signal using periodic timing signal and an information signal;

b. producing, in response to said first signal, a first impulse radio signal consisting of a first type of waveform;

c. producing, in response to said delayed first signal, a delayed first impulse radio signal consisting of said first type of waveform;

d ~~e~~. producing, in response to said second signal, a second impulse radio signal consisting of a second type of waveform, wherein said second type of impulse waveform is substantially an inverse of said first type of impulse waveform;

e ~~f~~. producing, in response to said delayed second signal, a delayed second impulse radio signal consisting of said second type of waveform; and

f ~~g~~. combining at least one of said first impulse radio signal and said delayed first impulse radio signal with at least one of said second impulse radio signal and said delayed second impulse radio signal, thereby producing a flip modulated impulse radio signal.

64. (previously presented) The method according to claim 63, wherein step a. comprises producing said first signal, said delayed first signal, said second signal and said delayed second signal based on at least said information signal and a code signal, and wherein said first signal comprises a first trigger signal, said delayed first signal comprises a delayed first trigger signal, said second signal comprises a second trigger signal, and wherein said delayed second signal comprises a delayed second trigger signal.

65. (previously presented) The method according to claim 63, wherein step a. comprises producing said first signal, said delayed first signal, said second signal and said delayed second signal based on at least said information signal and a code signal, and wherein said first signal comprises a first enable signal, said delayed first signal comprises a delayed first enable signal, said second signal comprises a second enable signal, and wherein said delayed second signal comprises a delayed second enable signal.

66. (previously presented) The impulse radio transmitter of claim 65, further comprising the step of producing a common trigger signal using said periodic timing signal and said information signal, and

wherein step b. comprises producing said first impulse radio signal in response to said first enable signal and said common trigger signal,

wherein step c. comprises producing said delayed first impulse radio signal in response to said delayed first enable signal and said common trigger signal,

wherein step d. comprises producing said second impulse radio signal in response to said second enable signal and said common trigger signal, and

wherein step e. comprises producing said delayed second impulse radio signal in response to said delayed second enable signal and said common trigger signal.

67. (previously presented) The method according to claim 66, wherein:

said first impulse radio signal is produced in response to reception of both said common trigger signal and said first enable signal,

said delayed first impulse radio signal is produce in response to reception of both said common trigger signal and said delayed first enable signal,

said second impulse radio signal is produced in response to reception of both said common trigger signal and said second enable signal, and

said delayed second impulse radio signal is produce in response to reception of both said common trigger signal and said delayed second enable signal.

68. (previously presented) The method according to claim 63, wherein said first impulse waveform consists of a negative impulse and wherein said second impulse waveform consists of a positive impulse.

69. (previously presented) The method according to claim 63, wherein said first impulse waveform corresponds to a first data state and a second data state, and said second impulse waveform corresponds to a third data state and a forth data state.

70-77 (Withdrawn)

78. (New) A method for generating an impulse radio signal, comprising:

triggering at least one first pulser that generates at least one first impulse radio waveform in accordance with one of a plurality of states of an information signal; and

triggering at least one second pulser that generates at least one second impulse radio waveform in accordance with another one of the plurality of states of the information signal, wherein the at least one first impulse radio waveform and the at least one second impulse radio waveform are not generated at the same time.

79. (New) The method of claim 78, further comprising:

enabling one of the first pulser and the second pulser prior to the triggering of the at least one first pulser and the at least one second pulser.

80. (New) The method of claim 78, wherein the at least one first pulser and the at least one second pulser are triggered in response to a common signal.

81. (New) The method of claim 80, wherein the common signal comprises a complimentary signal.

82. (New) The method of claim 78, wherein the at least one first pulser and the at least one second pulser comprise a differential circuit.

83. (New) The method of claim 78, wherein one of the plurality of states of the information signal corresponds to a non-inverted impulse radio waveform and another one of the plurality of states of the information signal corresponds to an inverted impulse radio waveform.

84. (New) The method of claim 83, wherein two of the plurality of states of the information signal comprise at least one of:

a first non-inverted impulse radio waveform and a second non-inverted waveform that is delayed relative to the first non-inverted impulse radio waveform by a delay; and

a first inverted impulse radio waveform and a second inverted waveform, which is delayed relative to the first inverted impulse radio waveform by a delay.

85. (New) The method of claim 84, wherein the delay comprises a quarter of wavelength.

86. (New) A method for generating an impulse radio signal, comprising:

enabling at least one first pulser that generates at least one first impulse radio waveform in accordance with one of a plurality of states of an information signal; and

enabling at least one second pulser that generates at least one second impulse radio waveform in accordance with another one of the plurality of states of the information signal, wherein the at least one first impulse radio waveform and the at least one second impulse radio waveform are not generated at the same time.

87. (New) The method of claim 86, further comprising:

triggering at least one of the at least one first pulser and the at least one second pulser after enabling thereof.

88. (New) The method of claim 87, wherein at least one of the at least one first pulser and the at least one second pulser is triggered in response to a timing signal.

89. (New) The method of claim 88, wherein the timing signal comprises a common timing signal.

90. (New) The method of claim 88, wherein the timing signal comprises a periodic timing signal.

91. (New) The method of claim 86, wherein one of the plurality of states of the information signal corresponds to a non-inverted impulse radio waveform and another one of the plurality of states of the information signal corresponds to an inverted impulse radio waveform.

92. (New) The method of claim 91, wherein at least two of the plurality of states of the information signal corresponds to one of:

a first non-inverted impulse radio waveform and a second non-inverted waveform that is delayed relative to the first non-inverted impulse radio waveform by a delay; and

a first inverted impulse radio waveform and a second inverted waveform, which is delayed relative to the first inverted impulse radio waveform by a delay.

93. (New) The method of claim 92, wherein the delay comprises a quarter of wavelength.

94. (New) A method of generating an impulse radio signal, comprising:

timing at least one first trigger signal to trigger at least one first pulser that generates at least one first impulse radio waveform in accordance with one state of an information signal;

timing at least one second trigger signal to trigger at least one second pulser that generates at least one second impulse radio waveform in accordance with another state of the information signal, wherein the at least one first impulse radio waveform and the at least one second impulse radio waveform are not generated at the same time.

95. (New) The method of claim 94, further comprising:

enabling one of the first pulser and the second pulser in accordance with a state of the information signal prior to the triggering of the at least one first pulser and the at least one second pulser.

96. (New) The method of claim 94, wherein the at least one first pulser and the at least one second pulser are triggered in response to a common signal.

97. (New) The method of claim 96, wherein the common signal comprises a complimentary signal.

98. (New) The method of claim 94, wherein the at least one first pulser and the at least one second pulser comprise a differential circuit.

99. (New) The method of claim 94, wherein one of the plurality of states of the information signal corresponds to a non-inverted impulse radio waveform and another one of the plurality of states of the information signal corresponds to an inverted impulse radio waveform.

100. (New) The method of claim 99, wherein two of the plurality of states of the information signal comprise at least one of:

a first non-inverted impulse radio waveform and a second non-inverted waveform that is delayed relative to the first non-inverted impulse radio waveform by a delay; and

a first inverted impulse radio waveform and a second inverted waveform, which is delayed relative to the first inverted impulse radio waveform by a delay.

101. (New) The method of claim 100, wherein the delay comprises a quarter of wavelength.

102. (New) An apparatus for generating an impulse radio signal, comprising:

at least one first pulser that generates at least one first impulse radio waveform in accordance with one of a plurality of states of an information signal;

at least one second pulser that generates at least one second impulse radio waveform in accordance with another state of the plurality of states of the information signal;

a first trigger signal generator for triggering the at least one first pulser; and

a second trigger signal generator for triggering the at least one second pulser, wherein the at least one first impulse radio waveform and the at least one second impulse radio waveform are not generated at the same time.

103. (New) The apparatus of claim 102, further comprising:

at least one enable signal generator for enabling one of the first pulser and the second pulser prior to the triggering of the at least one first pulser and the at least one second pulser.

104. (New) The apparatus of claim 102, wherein the at least one first pulser and the at least one second pulser are triggered in response to a common signal.

105. (New) The apparatus of claim 104, wherein the common signal comprises a complimentary signal.

106. (New) The apparatus of claim 102, wherein the at least one first pulser and the at least one second pulser comprise a differential circuit.

107. (New) The apparatus of claim 106, wherein the differential circuit comprises a first complimentary input and a second complimentary input, wherein the first complimentary input and second complimentary input are complimentary to each other.

108. (New) The apparatus of claim 102, wherein one of the plurality of states of the information signal corresponds to a non-inverted impulse radio waveform and another one of the plurality of states of the information signal corresponds to an inverted impulse radio waveform.

109. (New) The apparatus of claim 108, wherein two of the plurality of states of the information signal comprise at least one of:

a first non-inverted impulse radio waveform and a second non-inverted waveform that is delayed relative to the first non-inverted impulse radio waveform by a delay; and

a first inverted impulse radio waveform and a second inverted waveform that is delayed relative to the first inverted impulse radio waveform by a delay.

110. (New) The apparatus of claim 109, wherein the delay comprises a quarter of wavelength.

111. (New) An apparatus for generating an impulse radio signal, comprising:

at least one first pulser that generates at least one first impulse radio waveform in accordance with one of a plurality of states of an information signal;

at least one second pulser that generates at least one second impulse radio waveform in accordance with another one of the plurality of states of the information signal;

a first enable signal generator that enables the at least one first pulser; and

a second enable signal generator that enables the at least one second pulser, wherein the at least one first impulse radio waveform and the at least one second impulse radio waveform are not generated at the same time.

112. (New) The apparatus of claim 111, further comprising:

at least one trigger signal generator that triggers at least one of the at least one first pulser and the at least one second pulser after the enabling thereof.

113. (New) The apparatus of claim 112, wherein the at least one first pulser and the at least one second pulser are triggered in response to a timing signal.

114. (New) The apparatus of claim 113, wherein the timing signal comprises a common timing signal.

115. (New) The apparatus of claim 113, wherein the timing signal comprises a periodic timing signal.

116. (New) The apparatus of claim 111, wherein the at least one first pulser and the at least one second pulser comprise a differential circuit.

117. (New) The apparatus of claim 116, wherein the differential circuit comprises a first complimentary input and a second complimentary input, wherein the first complimentary input and second complimentary input are complimentary to each other.

118. (New) The apparatus of claim 111, wherein one of the plurality of states of the information signal corresponds to a non-inverted impulse radio waveform and another one of the plurality of states of the information signal corresponds to an inverted impulse radio waveform.

119. (New) The apparatus of claim 118, wherein at least two of the plurality of states of the information signal corresponds to one of:

a first non-inverted impulse radio waveform and a second non-inverted waveform, which is delayed relative to the first non-inverted impulse radio waveform by a delay; and

a first inverted impulse radio waveform and a second inverted waveform, which is delayed relative to the first inverted impulse radio waveform by a delay.

120. (New) The apparatus of claim 119, wherein the delay comprises a quarter of wavelength.

121. (New) An apparatus for generating an impulse radio signal, comprising:

at least one first pulser that generates at least one first impulse radio waveform in accordance with one state of an information signal;

at least one second pulser that generates at least one second impulse radio waveform in accordance with another state of the information signal;

a first timing circuit for timing at least one first trigger signal to trigger the at least one first pulser; and

a second timing circuit for timing at least one second trigger signal to trigger the at least one second pulser, wherein the at least one first impulse radio waveform and the at least one second impulse radio waveform are not generated at the same time.

122. (New) The apparatus of claim 121, further comprising:

at least one enable signal generator that enables one of the first pulser and the second pulser in accordance with a state of the information signal prior to the triggering of the at least one first pulser and the at least one second pulser.

123. (New) The apparatus of claim 121, wherein the at least one first pulser and the at least one second pulser are triggered in response to a common signal.

124. (New) The apparatus of claim 123, wherein the common signal comprises a complimentary signal.

124. (New) The apparatus of claim 121, wherein the at least one first pulser and the at least one second pulser comprise a differential circuit.

125. (New) The apparatus of claim 124, wherein the differential circuit comprises a first complimentary input and a second complimentary input, wherein the first complimentary input and second complimentary input are complimentary to each other.

126. (New) The apparatus of claim 121, wherein one of the plurality of states of the information signal corresponds to a non-inverted impulse radio waveform and another one of the plurality of states of the information signal corresponds to an inverted impulse radio waveform.

127. (New) The apparatus of claim 126, wherein two of the plurality of states of the information signal comprise at least one of:

a first non-inverted impulse radio waveform and a second non-inverted waveform that is delayed relative to the first non-inverted impulse radio waveform by a delay; and

a first inverted impulse radio waveform and a second inverted waveform, which is delayed relative to the first inverted impulse radio waveform by a delay.

128 (New) The apparatus of claim 127, wherein the delay comprises a quarter of wavelength.